Amendments to the Claims

The following listing of the claims will replace all prior versions, and listings of the claims in the application:

Listing of Claims

1-3 Canceled

4. (Currently amended) An m-to-n multicast concentrator for routing input signals, each of the input signals being 0-bound, 1-bound, bicast, or idle, the concentrator comprising:

m input ports to receive the input signals,

m output ports partitioned into two groups wherein m-n of the m output ports are grouped as a 0-output group and the remaining n output ports are grouped as a 1-output group, and

means, including at least one bicast cell, responsive to the input signals, for routing the maximum possible total number of 0-bound and bicast ones of the input signals to the 0-output group and the maximum possible total number of 1-bound and bicast ones of the input signals to the 1-output group.

5. (Previously presented) The multicast concentrator as recited in claim 4 wherein the total number of the input signals is m, among which the number of 0-bound signals is x_0, the number of 1-bound signals is x_1, the number of bicast signals is x_b, where x_b, x_0 and $x_1 \leq m$, and the number of idle signals is $m-x_0-x_1-x_b$, the maximum possible total number of 0-bound and bicast ones of the input signals routed to the 0-output group of the concentrator is $\min\{m-n, x_0+x_b\}$, and the maximum possible total number of 1-bound and bicast ones of the input signals routed to the 1-output group of the concentrator is $\min\{n, x_1+x_b\}$.

6. (Previously presented) The multicast concentrator as recited in claim 4 wherein the 0-bound input signals are classified into r_0 priority classes, $r_0>1$, and the 1-bound input signals are classified into r_1 priority classes, $r_1>1$, and the means for routing includes means for routing the maximum possible total number of 0-bound and bicast ones of the input signals according to the priority classes of the 0-bound input signals to the 0-output group and the maximum possible total number of 1-bound and bicast ones of the input signals according to the priority classes of the 1-bound input signals to the 1-output group.

7. (Previously presented) The multicast concentrator as recited in claim 6, wherein the means for routing generates any one of the following three conditions: (a) for any given priority class among the r_0 priority classes of the 0-bound input signals excluding the highest one of the r_0 priority classes, the maximum possible total number of 0-bound input signals routed to the 0-output group of the concentrator is $\min\{m-n, x_0\}$ where x_0 is the number of 0-bound signals having the priority class strictly higher than the said given priority class among the r_0 priority classes, or (b) for any given priority class among the r_1 priority classes of the 1-bound input signals excluding the highest one of the r_1 priority classes, the maximum possible total number of 1-bound input signals routed to the 1-output group of the concentrator is $\min\{n, x_1\}$ where x_1 is the number of 1-bound signals having the priority class strictly higher than the said given priority class among the r_1 priority classes, or (c) the maximum possible total number of 0-bound and bicast ones of the input signals routed to the 0-output group of the concentrator is $\min\{m-n, x_0+x_b\}$ where x_b, x_0 and $x_1 \leq m$, and the maximum possible total number of 1-bound and bicast ones of the input signals routed to the 1-output group of the concentrator is $\min\{n, x_1+x_b,\}$, where x_0, x_1, and x_b are the total numbers of 0-bound signals, 1-bound signals, and bicast signals, respectively.

8. (Previously presented) The multicast concentrator as recited in claim 6 wherein the means for routing includes:

means for configuring each of the bicast cells, in response to the two input signals arriving at said each of the bicast cells wherein the two input signals are in a specified combination such that one of the input signals is a bicast signal and the other is an idle signal, to produce a copy of the bicast signal at each of the two output ports of said each of the bicast cells,

means for modifying the routing tag of the copy of the bicast signal produced at the output-0 of said each of the bicast cells such that the routing tag indicates that the copy is a 0-bound signal having the lowest priority class among the r_0 priority classes of the 0-bound signals, and

means for modifying the routing tag of the copy of the bicast signal produced at the output-1 of said each of the bicast cells such that the routing tag indicates that the copy is a 1-bound signal having the lowest priority class among the r_1 priority classes of the 1-bound signals,

wherein the means for configuring each of the bicast cells, in response to the two input signals arriving at the said each of the bicast cells wherein the combination of the two signals is other than the specified combination, includes means for sorting the two input signals with respect to the partial order '"'0-bound with the highest priority' $\prec$ '0-bound with the second highest priority' $\prec$ ... $\prec$ '0-bound with the lowest priority' $\prec$ 'idle' $\prec$ '1-bound with the lowest priority' $\prec$ '1-bound with the second lowest priority' $\prec$ ... $\prec$ '1-bound with the highest priority' and '0-bound with the highest priority' $\prec$ '0-bound with the second highest priority' $\prec$ ... $\prec$ '0-bound with the lowest priority' $\prec$ 'bicast' $\prec$ '1-bound with the lowest priority' $\prec$ '1-bound with the second lowest priority' $\prec$ ... $\prec$ '1-bound with the highest priority'".

9. (Previously presented) A method for implementing an m-to-n multicast concentrator with reference to the network topology of an m-to-n concentrator, the m-to-n concentrator having m-n output ports grouped as a 0-output group and n output ports grouped as a 1-output group and constructed from a multi-stage interconnection network of sorting cells, the method comprising:

constructing a multi-stage interconnection network of nodes having the same network

topology as the multi-stage interconnection network of the m-to-n concentrator, and

filling each of the nodes of the constructed network with a bicast cell.

10. (Previously presented) A method for self-routing input packets in an m-to-n multicast concentrator, the multicast concentrator having m input ports to receive the input signals, m output ports partitioned into two groups wherein m-n of the m output ports are grouped as an 0-output group and the remaining n output ports are grouped as a 1-output group, and a multi-stage interconnection network of bicast cells, each of the input packets being 0-bound, 1-bound, bicast, or idle determined by a routing tag in a packet header, the method comprising:

configuring each of the bicast cells, in response to the two input packets arriving at said each of the bicast cells wherein the two packets are in a specified combination such that one of the input packets is a bicast packet and the other is an idle packet, to produce a copy of the bicast packet at each of the two output ports of said each of the bicast cells,

modifying the routing tag of the copy of the bicast packet produced at the output-0 of said each of the bicast cells such that the routing tag indicates that the copy is a 0-bound packet, and modifying the routing tag of the copy of the bicast packet produced at the output-1 of said each of the bicast cells such that the routing tag indicates that the copy is a 1-bound packet, and

configuring each of the bicast cells, in response to the two input packets arriving at the said each of the bicast cells wherein the combination of the two packets is other than the specified combination, to sort the two input packets with respect to the partial order "'0-bound' $\prec$ 'idle' $\prec$ 'l-bound' and '0-bound' $\prec$ 'bicast' $\prec$ '1-bound'".

11. (Previously presented) The method as recited in claim 10 wherein the 0-bound input packets are classified into r_0 priority classes, r_0>l, and the 1-bound input packets are classified into r_1 priority classes, r_1>l, and wherein the modifying the routing tag includes modifying the routing tag of the copy of the bicast packet produced at the output-0 of said each of the bicast cells such

that the routing tag indicates that the copy is a 0-bound packet having the lowest priority class among the r_0 priority classes of the 0-bound packets, and modifying the routing tag of the copy of the bicast packet produced at the output-1 of said each of the bicast cells such that the routing tag indicates that the copy is a 1-bound packet having the lowest priority class among the r_1 priority classes of the 1-bound packets, and

wherein the configuring each of the bicast cells includes configuring each of the bicast cells, in response to the two input packets arriving at the said each of the bicast cells wherein the combination of the two packets is other than said specified combination, to sort the two input packets with respect to the partial order '0-bound with the highest priority' $\prec$ '0-bound with the second highest priority' $\prec$ ... $\prec$ '0-bound with the lowest priority' $\prec$ 'idle' $\prec$ '1-bound with the lowest priority' $\prec$ '1-bound with the second lowest priority' $\prec$ ... $\prec$ '1-bound with the highest priority' and '0-bound with the highest priority' $\prec$ '0-bound with the second highest priority' $\prec$ ... $\prec$ '0-bound with the lowest priority' $\prec$ 'bicast' $\prec$ '1-bound with the lowest priority' $\prec$ '1-bound with the second lowest priority' $\prec$ ... $\prec$ '1-bound with the highest priority'".